CHAPTER 6
POTENTIAL MITIGATION MEASURES

6.0 POTENTIAL MITIGATION MEASURES

This chapter describes the mitigation measures that could be used to avoid or reduce potential environmental impacts that may result from implementation of the alternatives analyzed in Chapter 4. As specified in the Council on Environmental Quality's (CEQ's) National Environmental Policy Act (NEPA) regulations (40 *Code of Federal Regulations* [CFR] 1508.20), mitigation includes:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

A description of mitigation measures is also required by the New York State Environmental Quality Review Act (SEQR) (6 New York Code of Rules and Regulations [NYCRR] 617.9(b)(5)(iv)) for potential impacts identified in an environmental impact statement (EIS).

All of the decommissioning alternatives have the potential to produce short-term impacts to one or more resource areas. Alternatives that leave waste onsite have the potential for long-term impacts to the resource areas. Mitigation measures for decommissioning actions, as well as mitigation measures for long-term impacts, are identified in this chapter. "Short-term" for purposes of analysis in this EIS is the active project phase under each alternative during which the majority of construction, operations, and decommissioning activities would take place. "Long-term" is defined as the timeframe that extends beyond conclusion of the short term for each alternative. For more information, see Chapter 4, Section 4.6.3, Relationship Between Short-term Use of the Environment and Long-term Productivity.

This chapter reviews each of the resource areas covered in Chapter 4 and discusses: (1) the nature of potential impacts, (2) potential mitigation measures, and (3) how the need for mitigation measures changes with the alternatives evaluated in Chapter 4. In accordance with 10 CFR 1021.331, once an alternative has been selected in the Record of Decision, a Mitigation Action Plan will be prepared that describes the specific mitigation measures that will be taken for the selected alternative, considering the information presented in this chapter for mitigation of potential impacts. In addition, requirements for SEQR Findings, similar to the Record of Decision, will be met including identification of mitigation measures that will be used to reduce or eliminate impacts associated with the selected alternative.

Table 6–1 provides a list of potential mitigation measures, resource areas, and EIS alternatives, and identifies which resource areas and alternatives would benefit from the selected measures. The potential mitigation measures are divided into three aspects of decommissioning: those applicable during design and construction of new facilities or demolition of existing ones; during facility operation (e.g., facilities that operate during decommissioning activities); and over the long term. More details of the potential mitigation measures are discussed later in the chapter.

The first part of Table 6–1 identifies a list of potential mitigation measures that could be applied during design and construction of new facilities and existing facility demolition activities. Footnote (b) points out that some of the mitigation measures that might be implemented as part of construction (e.g., screens, buffer areas, and road improvements) may continue during facility operations.

Table 6–1 Potential Mitigation Measures

Mitigation Measure	*Resource Area*											*EIS Alternative* [a]			
	Land Use and Visual Resources	*Geology and Soils*	*Water Resources*	*Air Quality and Noise*	*Ecological Resources*	*Cultural Resources*	*Socioeconomics*	*Human Health and Safety*	*Waste Management*	*Transportation*	*Environmental Justice*	*Sitewide Removal*	*Sitewide Close-In-Place*	*Phased Decisionmaking*	*No Action*
Potential Mitigation Measures During Design, Construction or Demolition [b]															
Visual screens, lower-profile buildings	√											√	√	√	
Erosion and sediment controls		√	√		√	√						√	√	√	
Buffer zones			√		√			√				√	√	√	
Wetlands and floodplain protection measures			√		√							√	√	√	
Spill control measures			√		√			√				√	√	√	
Dust suppression measures				√				√				√	√	√	
Use of mufflers, properly sized equipment				√				√				√	√	√	
Scheduling of construction activities			√	√	√		√			√		√	√	√	
Personal protective equipment								√				√	√	√	
Road improvement, traffic controls				√			√	√		√		√	√	√	
Waste minimization									√			√	√	√	
Wastewater treatment systems			√					√				√		√	
Preventing contamination spread		√	√									√	√	√	
Potential Mitigation Measures During Facility Operations															
Road improvement, traffic controls				√			√	√		√		√		√	
Spill control measures			√		√			√				√	√	√	√
Personal protective equipment								√				√	√	√	√
Confinement systems with ventilation controls and filters				√	√			√				√ [c]	√	√ [d]	
Wastewater treatment systems			√					√				√ [e]	√ [e]	√	√
Scheduling							√	√		√		√	√	√	√

Mitigation Measure	*Resource Area*											*EIS Alternative* [a]			
	Land Use and Visual Resources	*Geology and Soils*	*Water Resources*	*Air Quality and Noise*	*Ecological Resources*	*Cultural Resources*	*Socioeconomics*	*Human Health and Safety*	*Waste Management*	*Transportation*	*Environmental Justice*	*Sitewide Removal*	*Sitewide Close-In-Place*	*Phased Decisionmaking*	*No Action*
Potential Long-Term Mitigation Measures															
Engineered barriers			√ [f]		√			√					√ [g]	√	√
Access controls								√				√ [h]	√	√	√
Erosion controls		√ [i]	√ [i]									√ [i]	√ [i]	√ [i]	√ [i]
Environmental monitoring		√	√		√			√				√	√	√	√

[a] A complete description of the alternatives is found in Chapter 2 of this EIS.

[b] Some of these mitigation measures that are initially implemented for the construction of facilities that aid decommissioning (e.g., the Container Management Facility) would remain during the operating phase of the facility.

[c] e.g., (1) Waste Tank Farm Waste Processing Facility, (2) Container Management Facility, (3) various enclosures to support exhumation efforts.

[d] Enclosures to support exhumation effort.

[e] e.g., Leachate Treatment Facility.

[f] Circumferential hydrologic barriers utilized as a long-term mitigation measure for protection of water resources (i.e., groundwater quality).

[g] e.g., (1) Waste Management Area (WMA) 1 through WMA 3 hydraulic barrier walls and multi-layer cap, (2) WMA 2 lagoons engineered multi-layer cover, (3) NDA engineered multi-layer cover, (4) SDA engineered multi-layer cover, (5) erosion control structures.

[h] Under the Sitewide Removal Alternative, the Container Management Facility would operate indefinitely until final disposition of decommissioning waste is realized. Access controls would be needed.

[i] Erosion controls as a long-term mitigation measure are more permanent measures when compared to "erosion and sediment controls" for design, construction, or demolition that are more temporary in nature (e.g., mitigation measures usually employed during construction).

The second part of Table 6–1 identifies a series of potential mitigation measures that could be applied during the actual decommissioning activities when facilities would be operating. These mitigation measures are intended to protect facility workers, reduce the discharge of hazardous material to the air and water, and reduce the impacts of material movement during the actual decommissioning activities. Many of the mitigation measures are integrated into facilities which are identified under the appropriate alternative.

The third part of Table 6–1 identifies potential mitigation measures that would reduce long-term impacts of releases of radioactive and hazardous chemicals for the waste remaining onsite. Long-term environmental monitoring of groundwater quality, engineered barriers, and erosion and access controls would identify potential environmental, safety, and health issues before they become a problem and while less effort can be undertaken to fix the problem immediately rather than later. The long-term environmental monitoring program would include monitoring the effectiveness of the multi-layer cover system and slurry wall in limiting infiltration of precipitation and groundwater into the burial area (see Appendix C, Section C.3.2.7.5, of this EIS). The performance of the engineered barriers would be subject to monitoring and maintenance and the overall performance of the engineered isolation systems would be monitored using data from an environmental monitoring program.

6.1 Land Use and Visual Resources

Decommissioning of the Western New York Nuclear Service Center (WNYNSC) would result in beneficial changes to visual resources for the site as industrial facilities are removed, but the removal actions could result in short-term impacts to visual resources as construction, demolition, and earthmoving activities are conducted. Potential mitigation measures for these impacts include utilizing soil berms and vegetation as screening, lower profile building designs, exterior colors that blend in with the surroundings, and directional lower wattage lighting.

Implementation of any of the action alternatives would result in some areas of the WNYNSC being available for release for other uses. However, the Sitewide Close-in-Place Alternative (and potentially Phase 2 of the Phased Decisionmaking Alternative), would involve the long-term commitment of land resources, an impact that would not be conducive to mitigation.

6.2 Geology and Soils

Construction and decommissioning activities would result in disturbance of soils. Adherence to best management practices for soil erosion and sediment control during land disturbing activities would serve to minimize soil erosion and loss. In general, best management practices would include limiting the amount of time soils are exposed, limiting the area disturbed during any phase of a construction project, regrading to avoid steep slopes, and applying protective coverings to denuded areas during construction (e.g., mulching and/or geotextiles) until such time as disturbed areas can be revegetated or otherwise covered by facilities. These practices would greatly reduce the potential for soil loss. Soil loss and offsite transport would be further reduced by the use of appropriate sedimentation and soil erosion and control devices, including redirection of runoff, sediment traps, silt fences, staked hay bales, vehicle washdown stations or other methods as weather conditions may dictate. Stockpiles of soil removed during construction would be covered with a geotextile or temporary vegetative covering to prevent loss by erosion. Temporary buildings could also be placed over the construction site to reduce soil erosion.

Temporary disturbance to soils outside the eventual footprint of new facilities would be limited by using paved parking lots or inactive areas within the building footprints for material laydown, storage, and parking, and by using narrow access corridors for construction equipment. To reduce the health risks from exposure to contaminated soils, areas would be tested prior to any ground disturbance.

Controlling the spread of contaminated media or materials or preventing the recontamination of remediated areas during decommissioning would be accomplished through the use of work sequencing, soil stabilization measures, temporary covers, and exclusion zones to reduce contaminant spread. Impacts to soils would also be mitigated by returning the uncontaminated soils to preexisting conditions to the extent possible. This would be accomplished by grading the land to its preconstruction topography.

6.3 Water Resources

Water resources include both surface water and groundwater potentially affected by implementation of project alternatives. Surface water would be protected from sediment by minimizing construction in or near water courses, by establishing vegetated buffer zones around water bodies, by erosion and sedimentation control measures (see Section 6.2 of this chapter), and by avoiding soil disturbing activities during wet seasons. Longer-term impacts to surface water resources could also be mitigated by restoring water courses, ponds, and wetlands to their preconstruction conditions.

Stormwater holding ponds would be constructed to decrease the impacts of runoff on surface water quality by collecting, detaining, and conveying stormwater runoff from buildings and other impervious surfaces. Appropriate mitigation measures would include erosion and sediment control structures, runoff interceptor trenches or swales, filter or silt berms/fences, sediment barriers or basins, rock-lined ditches/swales, slope shaping and retaining fences, surface water runoff management, stormwater drainage structures, and waste management systems. As necessary, potential erosion to disturbed areas would be mitigated by applying topsoil, adding rip-rap, and planting native vegetation.

Surface water and groundwater would be protected from spills of hazardous materials with the development and implementation of spill prevention and contingency plans for instances where hazardous materials are being handled. These plans to minimize the potential for spills of hazardous materials would include provisions for storage of hazardous materials and refueling of construction equipment within confines of protective berms, cleanup and recovery plans, and emergency response notification and protocols. Spills would also be reduced by keeping vehicles and equipment in good working order to prevent oil and fuel leaks. Water contaminated as a result of operational spills would be contained and treated prior to discharge to surface streams.

Groundwater mitigation measures include spill prevention (described in this section), preventing contamination spread (see Section 6.2 of this chapter), groundwater monitoring, circumferential hydrologic barriers, stormwater runoff, and wetland protection.

Mitigation measures to protect wetlands would be used when there are major removal activities, particularly soils associated with the nonsource area of the North Plateau Plume, the Cesium Prong, and the exhumation of the NDA and the State-licensed Disposal Area (SDA). Previous wetland studies and delineations have been performed for the site and are discussed in detail in Chapter 3, Section 3.8.2, and Appendix M of this EIS. Wetland impacts would be minimized by careful planning for construction right-of-ways and onsite construction vehicle transportation routes, perpendicular encroachment to known wetland areas, restoration of upgradient land areas prior to wetland encroachment, implementation and maintenance of best erosion and sedimentation practices, and restoration and/or compensatory replacement of wetland areas.

Floodplain impacts would be mitigated by coordinating with the New York State Department of Environmental Conservation (NYSDEC) to assure that requirements of their Floodplain Development and Floodway Guidance are met and restoring the floodplain to preexisting conditions. Further mitigation measures would be to minimize construction in the floodplain, establish vegetated buffer zones, and avoid soil disturbing activities during wet seasons. Stormwater runoff and erosion control measures identified in this section would also be employed to reduce impacts to the floodplain.

For those alternatives that include areas where waste would permanently remain onsite (e.g., in-place closure of the Waste Tank Farm, NDA, or SDA), engineered barriers would be used to mitigate the effect of gradual migration of contaminants. Under the Sitewide Close-In-Place Alternative, the major facilities would be closed in place. The residual radioactivity in facilities with long-lived radionuclides would be isolated by specially-designed closure structures and engineered barriers to control contamination. To control groundwater flow, for example, hydraulic barrier walls (e.g., vertical soil-bentonite slurry walls) would be constructed to divert groundwater flow around stabilized facilities. An upgradient chevron-shaped barrier wall would further reduce groundwater flow into the closed facilities area by laterally diverting groundwater flow around the circumferential slurry wall.

The performance of the engineered barriers to protect groundwater quality would be monitored as part of a long-term monitoring and maintenance system of mitigation measures.

6.4 Air Quality and Noise

Construction activities would generate hazardous and criteria air pollutants, as discussed in Chapter 4, Section 4.1.5.1, of this EIS. Emissions from construction equipment would be mitigated by maintaining the equipment to ensure that the emissions control systems and other components are functioning at peak efficiency. Additional air quality mitigation measures for construction emissions include, but are not limited to, the following:

- Use ultra low sulfur diesel fuel in off-road construction equipment with engine horsepower rating of 60 horsepower and above.
- Where practicable, use diesel engine retrofit technology (e.g., diesel oxidation catalysts) in off-road equipment to further reduce emissions.
- Limit unnecessary idling times on diesel-powered engines.
- Locate diesel powered exhausts away from fresh air intakes.

Soils and unconsolidated sediments exposed in excavations and slope cuts during new facility construction would be subject to wind erosion if left exposed. In addition, fugitive dust emissions would occur as a result of land disturbance by heavy equipment and motor vehicles causing suspension of soil particles into the air. Construction emissions would be mitigated using standard mitigation techniques, including watering and/or use of surfactants to control dust emissions from exposed areas, revegetation of exposed areas, watering of roadways, and minimizing construction activity under dry or windy conditions. To further ensure that airborne contaminates are not released to the atmosphere during soil excavation, the excavation work could take place beneath containment structures.

Facility decommissioning activities and new waste treatment facilities would generate airborne emissions of various pollutants, including radionuclides and nonradioactive organic and inorganic constituents. These emissions would be controlled using the best available control technologies to ensure that emissions are compliant with applicable standards. With the variety of air pollutant contributors and processes that would be deployed under the alternatives, there are a number of air pollutant control technologies that could be used. The technologies that would be used would be tailored for specific contaminants. Direct filtration or scrubbing are common mitigation measures for radionuclides and could be used with any of the alternatives.

Noise impacts during construction would be minimized by maintaining the equipment to ensure that the mufflers and other components are operating properly, by restricting the use of vehicle horns, and using the smallest (quietest) piece of equipment possible to get the job done. Additionally, construction activity would

be limited to daytime hours to reduce disruptive sources of annoyance to nearby residents (i.e., scheduling construction activities to avoid or minimize adverse impacts).

6.5 Ecological Resources

Potential impacts to ecological resources would include habitat loss (including wetlands) and increased mortality of wildlife (i.e., terrestrial and aquatic fauna), as well as indirect impacts such as displacement of wildlife from the affected area. Construction and decommissioning activities would incorporate mitigation measures for ecological impacts such as avoidance of undisturbed habitat (e.g., nesting areas) and timing land-disturbing activities to avoid animal breeding seasons. Where habitat would be affected, disturbed areas would be regraded and revegetated according to a sitewide revegetation plan. Also, noise and increased human presence would be mitigated by proper equipment maintenance and keeping workers within the work zone. Pre-activity biological surveys would be performed as necessary. For example, prior to land-disturbing activities, the proposed site would be surveyed for nests of migratory birds in accordance with the Migratory Bird Treaty Act. Although threatened and endangered species have not been recorded on the site, any mitigation actions deemed necessary through the consultation process regarding state and federally listed threatened and endangered species would be implemented if such species were recorded onsite in the future. (For applicable regulatory requirements, see Chapter 5, Section 5.6.1, Ecological Resources Consultations.)

Indirect impacts to wetlands and aquatic resources, such as sedimentation resulting from erosion, would be mitigated through the implementation of a soil erosion and sediment control plan. This could include the use of silt fencing, straw bales, rip-rap, regrading, and timely revegetation as appropriate. Stormwater runoff control measures, including erosion and sediment controls, would be installed, inspected, and maintained to prevent indirect impacts. Options to mitigate direct impacts to wetlands could range from the reestablishment of affected areas to the creation of new wetlands either on- or off site. Prior to the disturbance of any wetland, a Section 404 permit would be acquired from the U.S. Army Corps of Engineers. Specific requirements for fish management would be developed as part of the approval process prior to the closure of the reservoirs or remediation work taking place in streams.

While current biological conditions and mitigation guidelines are appropriate for determining mitigation requirements for impacts that would occur in the near term, they are not suitable for judging mitigation requirements that would not occur for many years because habitats and species assemblages may change over time. Consequently, the mitigation requirements for future activities that would occur under the alternatives considered would depend on the results of field surveys conducted just prior to initiating ground-disturbing activities and the mitigation guidelines in effect at that time.

6.6 Cultural Resources

Avoidance of identified cultural resources would be the primary form of mitigation wherever practical. Since the majority of activities under the alternatives would occur within previously disturbed areas contained within or adjacent to the developed areas, the likelihood that these areas contain cultural materials intact or in their original context is small, as indicated by the results of previous cultural resource studies. Chapter 3, Section 3.9, discusses cultural resource studies that have been previously conducted. Nevertheless, there is the potential to unearth or expose cultural materials during excavation, particularly along the creeks. To avoid the loss of cultural resources during construction, demolition, excavation, and site restoration, cultural resource surveys would be conducted in the area of interest. Although no alternative is expected to impact significant cultural resources, the potential for inadvertent discovery of prehistoric or archaeological resources exists. If any cultural resources were discovered during land-disturbing activities, those activities would be halted, and consultations would be conducted with the New York State Historic Preservation Officer, and concerned American Indian Tribes, as appropriate. As appropriate, the U.S. Department of Energy (DOE) would coordinate with the Seneca Nation of Indians to address any potential impacts as a result of implementing the

preferred alternative. Land-disturbing activities would be resumed after impacts were mitigated by avoidance, or collection and documentation.

6.7 Socioeconomics

Socioeconomic impacts would occur during construction and decommissioning due to the addition of workers to perform these activities. These impacts would be mitigated by scheduling of construction and decommissioning activities in sequence rather than concurrently, although this could cause some delays in the initiation or completion of the projects and result in increased project costs.

The eventual completion of WNYNSC decommissioning activities and the associated reduction in onsite employment and expenditures would have an impact on site employees and the local economy. Adverse impacts to employees could be mitigated by the use of job placement and retraining services. Adverse impacts to the local economy could be mitigated by the future redevelopment of the site; however, at this time, no information is available about likely future uses of the site.

6.8 Human Health and Safety

Mitigation measures to protect workers from physical hazards during construction or demolition would involve safety reviews of planned activities and the implementation of best management practice safety measures including bracing and stabilization of buildings and excavations during construction and demolition, protective equipment, and safety monitoring and inspection. These mitigation measures would comply with applicable State and Federal safety requirements.

There would also be mitigation measures to protect workers from radiological and chemical exposure hazards during construction, operation, and demolition activities. These mitigation measures would be derived from formal radiation protection programs and chemical hazards management programs. Examples of specific measures include personal protective equipment (e.g., Tyvek® suits, face masks), shielding (e.g., earth berms, concrete walls, steel plates, lead bricks), remotely operated robotic machinery, training, and spreading the work across a larger number of workers. Radiation protection mitigation measures would include formal analysis by the workers, supervisors, and radiation protection personnel of the work in a radiological environment and identification of methods to reduce exposure of workers to the lowest practicable level. For all activities involving radiation work, the principle of maintaining doses as low as reasonably achievable (ALARA) would be followed. Examples of ALARA measures include minimizing time spent in the field of radiation, maximizing distances from sources of radiation, using shielding whenever possible, and/or reducing the radiation source. These mitigation measures would comply with applicable State and Federal safety requirements.

Many of the mitigation measures intended to protect workers, as well as the public, are integrated into the facilities that would be constructed to facilitate decommissioning, including the Waste Tank Farm Waste Processing Facility, Container Management Facility, various enclosures and confinement structures intended to facilitate waste exhumation, and the Leachate Treatment Facility. These facilities/engineered systems and their respective design elements that would reduce potential human health impacts are described in Appendix C. Section C.4 in Appendix C provides a detailed description of these facilities, as well as some of the design elements that would be incorporated in the construction and operations of these facilities to reduce potential human health impacts.

The construction and operation of waste management facilities and the decommissioning and removal of facilities, as well as long-term stewardship activities, would have impacts on worker and public health and safety. The primary mitigation measure to reduce the impact to both the public and workers would involve the use of best management practices and engineered systems (both described earlier) to limit access to and discharge of hazardous radioactive and chemical materials to the environment.

Long-term impacts to the public from exposure to contaminated media (i.e., soil, water, plants, and animals) would be mitigated through the use of access controls (e.g., fences, warning signs, and personnel to limit public access to contaminated areas) and engineered barriers designed to reduce the migration of contaminants to the accessible environment from the NDA and SDA or other areas where significant contamination would remain on site (e.g., Main Plant Process Building in Waste Management Area [WMA] 1, Waste Tank Farm in WMA 3 under the Sitewide Close-In-Place Alternative). In places where fencing would not be practical (e.g., along a public stream or creek) signs and mailings could be used to warn against ingestion of contaminated water, plants, and animals. The performance of the engineered barriers would be subject to monitoring and maintenance where practical, and the overall performance of the engineered isolation systems would be monitored using data from an environmental monitoring program.

6.9 Waste Management

Waste management impacts would primarily be mitigated through waste minimization efforts designed to minimize the volumes of waste generated for shipment to offsite disposal locations. These waste minimization efforts would be considered in the design of wastewater treatment systems as well as solid waste treatment systems, particularly those that support the Sitewide Removal Alternative, which would generate large volumes of waste. In addition, waste management impacts would be reduced through the use of best management practices such as proper waste segregation, handling, packaging, and storage.

6.10 Transportation

Both radiological and nonradiological impacts would result from shipment of radioactive or hazardous materials from the WNYNSC to offsite disposal sites. Measures that could be used to mitigate radiological impacts to individuals and populations along the transportation route include transporting materials or wastes only during periods of light traffic volume, and training for emergency response personnel. Local traffic impacts could be mitigated through the use of turning lanes for entering and exiting the West Valley Site, as well as traffic signals at major intersections.

Implementing any action alternative would impact local traffic conditions, especially during the morning and afternoon commutes. Measures that would be used to mitigate traffic volume impacts, particularly for alternatives with higher levels of site employment, are employee programs and incentives for ridesharing, and employee programs that provide flexible hours or staggered work shifts.

6.11 Environmental Justice

No environmental justice mitigation measures are expected to be necessary for any of the alternatives, because no disproportionately high and adverse environmental justice impacts have been identified.